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ODS AND BEVERAGES

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Subterraneous fermenting vat

A.D. 1841 . . . . N° 8921.

Apparatus for Brewing.

TIZARD'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, William Littell Tizard, of Birmingham, in the County of Warwick, Brewer, send greeting.

WHEREAS I did by petition humbly represent unto Her present most Excellent Majesty Queen Victoria, that after considerable application and expence I had invented "Certain Improvements in Apparatus for Brewing," and Her said Majesty being willing to give encouragement to all arts and inventions which may be for the public good, was graciously pleased by Her Royal Letters Patent, under the Great Seal of the United Kingdom of Great Britain and Ireland, bearing date at Westminster, the Fifth day of April, One thousand eight hundred and forty-one, in the fourth year of Her reign, for Herself, Her heirs and successors, to give and grant unto me, the said William Littell Tizard, my ex̃ors, adm̃ors, and assigns, Her especial licence, full power, sole privilege and authority, that I or they, by myself or themselves, or by my or their deputies, servants, or agents, or such others as I or they should agree with (and no others), during the term of fourteen years from the date of the said Letters Patent, should and lawfully might make, use, exercise, and vend my said Invention within that part of Her Majesty's Dominions called England, Her Dominions of Wales, and Town of Berwick-upon-Tweed, in such manner as to me, my ex̃ors, adm̃ors, and assigns, shall seem meet, and as that I or they shall enjoy the whole profit and advantage arising by reason of the said Invention, during the said term of fourteen years, and for that end Her said Majesty requires and strictly commands all Her subjects whatsoever within England, Wales, and Berwick-upon-Tweed aforesaid, that they shall not, neither directly nor indirectly, make, use, or put in practice my said Invention, or any part thereof, nor in anywise counterfeit, imitate, or resemble the same, nor make any addition thereto, or substraction therefrom, whereby to pretend himself or themselves to be the Inventor or Inventors thereof: And whereas the said Letters Patent also contain a proviso, obliging me, the said William Littell Tizard, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and seal, and to cause the same to be enrolled in Her Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same (reference being thereunto had) will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said William Littell Tizard, do hereby declare that my said Invention is described and ascertained in the manner following, and by the aid of eleven Sheets of Drawings hereunto annexed, that is to say:—

My improvements in "apparatus for brewing" relate first to the mash tub, of which Sheet 1 is vertical elevation. The mash tun is shewn as resting upon the under bank, which is also shewn in vertical elevation.

A, A, is the mash tub; B, B, the under back; C, C, C, C, are standards of iron fixed to the vertical sides of the mash tub, for the purpose of supporting the cross bar D, D. A vertical shaft E, E, is situated in the centre of the cross bar D, D, which is also the centre of the mash tub; the shaft E, E, (which is hollow), revolves by means of the bevil wheels F, F, when motion is communicated to the shaft I through the medium of a belt working on the farst pulley G; the pulley H is a loose pulley, on the periphery of which the belt works when the shaft I is required to remain in a stationary or quiescent position. The chairs J and K, in which the shaft I revolves, are supported by the cross bar D, D. The hollow shaft E, E, which passes through the mash tub and occupies its center, carries a moveable cross bar L, L, which moves in a horizontal circular path on the top edge of the mash tub when the shaft E revolves. The center of the hollow shaft E is occupied by a pipe M, for the conveyance of hot water, and N is also a pipe occupying the center of the mash tub, by which the water escapes when it has performed its required offices, as will be hereafter explained.

Sheet 2 is a vertical elevation of the mash tub of the under bark and hop convertor.

Sheet 3 is a sectional plan of mash tub through the line *a, a,* Sheet 4, and a plan of under bark.

Sheet 4 is a vertional elevation of mash tub (and an end elevation of the under bark through the line *a, a,* on the plan, Sheet 3.

Sheet 5 is a sectional elevation of the mash tub, shewing the "attemperator" in its proper position for working.

Sheet 6 is a sectional elevation of the mash tub, shewing the "hystricon" in its proper position for working.

Sheet 7, Figures 1, 2, 3, and 4, shews the particular construction of the "attemperator."

Sheet 8, Figures 1, 2, 3, and 4, shews the particular construction of the "hystricon."

Sheet 9 shews my improvement in mills for crushing malt.

Sheet 10 shews my subterraneous fermenting cavern.

Sheet 11 shews the construction of lamp which I propose to use for lighting the subterraneous cavern, and also absorbing the heat, and warning when carbonic acid gas has accumulated to a dangerous extent in the fermenting room.

Sheet 11, Fig. 3, also shews what I call a trepidator. The mechanism which causes the cross bar D, D, to traverse round the mash tub is shewn full size on Sheet 11, Fig. 4.

Having described generally the Drawings on Sheets 1 to 11 inclusive, I shall now particularly describe the action of my improved mashing machine, reference being made to the Drawings, Sheets 1, 2, 3, 4, 5, and the references thereon.

Firstly, my mashing machine is a cylindrical vessel, having on its upper edge a circular rack, into the teeth of which an endless screw is made to work by the following contrivance:—A bevil wheel O fixed on the hollow shaft E, Sheet 1, works into another bevil wheel, which is fixed on the shaft P; the shaft P has a worm at the opposite end, which works into a worm wheel carried by the box Q; the axle which is carried by the box Q is placed at right angles to the shaft P, and on the same shaft which carries the worm wheel a worm is also fixed; by the rotation of this worm wheel through the medium of the shaft P the worm contained in the box Q is made to revolve on the teeth of the circular rack which is fixed on the top edge of the mash tub; the worm by its rotation causes the cross bar D, D, to revolve in a horizontal path round the center of the mash tub; (the mechanism which produces this effect is more particularly shewn on Sheet 11, Fig. 4. To the cross bar D, D, the "attemperator" is fixed.

Sheet 7 shews the construction of the "attemperator;" it consists of a frame supporting two rows of vertical zig-zag pipes, and a certain arrangement of machinery for giving these pipes a lateral motion to and from the center of the mash tub, so that the "attemperator" has a motion compounded of the motion in a vertical plane round the center of the mash tub, by virtue of its connection with the cross bar D, D, when that bar is in motion, and of the motion to and from the center of the mash tub, by the following mechanism:—The horizontal shaft P, Sheet 1, has a bevil wheel S fixed upon it and revolving with it; this bevil wheel S works into a bevil wheel T of the "attemperator," Sheet 7, Figure 12 and 4. The wheel T is fixed on the top of a vertical cranked shaft, shewn at A, Figures 2, 3, and 4. The bevil wheel T causes this shaft to revolve and give motion to the connecting rod U, which gives motion to the two bars V, V, in the arc of a circle, round their centers *a*, *a*. Two other bars *b*, *b*, are connected at right angles to the bars V, V, by joints or pivots, *c*, *c*, *c*, *c*. There are two pairs of the bars V, V, one pair under the other pair. On one of the lowermost bars V a pivot or pin *a* is fixed, which is moved backwards and forwards by the crank U. To the bars *b*, *b*, *b*, *b*, zig-zag pipes *a*, *a*, are fixed, one row of zig-zag pipes to one set of parallel bars *b*, *b*, and another set of zig-zag pipes to another and opposite set of parallel bars *b*, *b*; these zig-zag pipes are connected together and formed into one system or pipe, in the manner following:—The end of the pipe Z, Sheet 7, Figure 2 and 3, is connected by a piece of elastic hose to the end of the pipe Y, Figure 3, and is then formed into one continuous pipe of a zig-zag form, the entrance being at X and the exit at W, or vice versa. The object in connecting the two series of pipe by a piece of elastic hose is to allow the parallel bars *b*, *b*, to approach each other as the bars V, V, onillate round their centers of motion, by means of the mechanical arrangement now described and shewn on Sheet 7. The series of zig-zag pipes X, Y, Figure 3, move in a contrary direction to the series Z, W, so as to pass and repass each other. The "attemperator" when in use for mashing is fixed to the cross bar D, D, and to the square box 4, 4, and is shewn in its proper position on Sheet 5. The mash having been placed in the mashing machine, and the time having arrived for mashing up, motion is communicated by a belt to the attemperator by means of the previously described machinery. The mash reposes on a perforated false bottom of the mashing tub, and the "attemperator" is buried in it. Hot water (or steam) is conveyed from the pipe 1, Sheet 5, by a elastic hose to the entrance W of the "attemperator;" it passes through the zig-zag pipes, and makes its exit by another elastic hose attached to the pipe X, Sheet 7, of the attemperator, and finally leaves the mashing machine by passing of at the pipe 2, Sheet 3. The velocity of the current of hot water or steam passing through the "attemperator," and also its temperature, admit of regulation, so as to retain the mash at the proper degree of heat for any length of time, at the will of the brewer. The mash is kept at the required temperature by means of the hot water or steam which flows in a regulated current through the "attemperator," the latter giving off heat to the mash as it travels in a circle round the center of the mash tub, and also backwards and forwards in a radial line to the center. The "attemperator" being buried in the mash communicates heat to all parts of it, and at the same time, by virtue of its combined motion, serves the office of a mashing machine. When the operation of washing has been performed, and the wort drawn off by the cork *z*, Sheet 2, the "attemperation" must be removed from the mash tub and the elastic hose removed from the pipes 1 and 2, Sheet 5, which latter operation can be readily performed by elevating the screw 3, Sheet 1, 2, and 4, until the box 4, 4, and pipes 1 and 2, Sheet 5, are above the surface of the goods, the tube E sliding through a stuffing box in the bottom of the mash tub. The pipes 1 and 2, Sheet 5, are fixed into one side of a square box; the side opposite to the pipe 1 and 2 is moveable, and when the "attemperator" is removed, this plate must also be removed, by unscrewing the nut 3 of the lid or side of the box 4, 4, and the "hystricon" attached to the cross bar D, D, as shewn on Sheet 6.

The construction of the "hystricon" is exhibited on Sheet 8, Figures 1, 2, 3, and 4. Figure 1 is a plan of the "hystricon," which consists of a moveable apparatus for sparging the mash with hot water, and removing the surface of the goods, so as to expose a fresh surface continually to the action of the sparging apparatus, and an endless belt for the purpose of discharging the goods from the mash tun. The end A, A, of the "hystricon" is attached to the square box 4, 4, in the centre or the mash tub, and also to the cross bar D, D, Sheet 6, and revolves with it. The hystricon and square box have also a downward motion communicated by the screw situated under the bottom of the mash tun, Sheets 1, 2, and 4. The center round which the hystricon revolves in a horizontal direction is shewn at B, Sheet 8, Figure 1, and when at work it revolves in the direction shewn by the arrow; the front part being a conductor of iron, travelling just under the surface of the grains; as the hystricon revolves the goods ascend the inclined surface of the conductor, and pass on to an endless webb, which discharges the grains down the hollow shaft which forms the center of the mash tub. Immediately behind the endless web is a sparger or hollow pipe C, C, into which hot water is brought by a flexible hose, screwed on to the end of the pipe C, C, at D. The pipe is perforated with small holes, out of which the hot water issues on to the surface of the mash, for the purpose of washing out the saccharine. The sparger is followed by an agitator or porcupine, for the purpose of disturbing and exposing the surface of the goods to the action of the sparger C, C. The agitator or porcupine has a rotative reciporating motion given to it by the ram wheel F and connecting rod G moving the agitator or porcupine along the toothed surface of a stationary rack H; the action of the apparatus is more clearly shewn at Figure 4. The center round which the porcupine moves in the arc of a circle being shewn at I, a backward and forward rotary motion is thus communicated to the shaft E, E, and to the arms fixed at right angles to it. The upright shaft H, Sheet 8, gives motion to the cam wheel F, and also to the worm I; the latter gives motion to one of the rollers J, on which the endless web moves; the other roller, on which the endless band moves, is seen at K, Figure 2: the endless web is shewn, Figure 2, by dotted lines, and the direction in which it moves is pointed out by arrows, and an apparatus is shewn at K, Figure 2, Sheet 8, for the purpose of tightening the endless band.

The particular construction of the "hystricon" having now been explained, its mode of action will be better understood by reference to Sheet 6, where it is shewn at the bottom of the mash tun, having in its passage from the top downwards sparged the goods, agitated the surface, and finally expelled the grains (except sweepings) from the mash tun through the aperture formed in the square box. When the door 4, 4, on Sheet 4, is removed, as previously described, the grains fall down the hollow pipe E, the small pipe *a, a,* Sheet 4, forming the bottom of E, being removed for this purpose, the use of the small connecting pipe *a, a,* being to conduct the hot water or steam to the pipe N, when the attemperator is at work; motion is given to the vertical shaft H by means of a spur wheel M fixed into it and working into another spur wheel L fixed on to the hollow shaft E, Sheet 6; (this shaft H is shewn on a larger scale on Sheet 8.) Another vertical shaft N passes through a hole in the end O of the cross bar D, D, and is connected at the bottom by a screw to the hystricon. The bar N moves freely up and down, as may be required, in the hole O, and its use is to cause the hystricon to revolve when the cross bar D, D, revolves, by connecting the hystricon and cross bar D, D, together; the shaft H merely gives motion to the endless web for discharging the grains, and to the porcupine for agitating their surface. Two friction rollers are fixed at the end O of the cross bar D, D, which run on the edge of the tub, and reduce the friction which would otherwise exist there; the mechanism for giving motion to the cross bar D, D, being fixed in the box at the opposite end of the cross bar, as previously described. The hot water which supplies the sparger (forming part of the hystricon) is brought from an elevated reservoir down the pipe N, Sheet 4, to the pipe 1; an elastic hose is screwed into the pipe 1, the other end being screwed on to the end D of the pipe C, C, on Sheet 8. The pipe 2, Sheet 4, has a cap screwed on to it, to prevent the hot water, which is used in sparging, from passing down the pipe E instead of through the perforated bottom of the mash tun. It will be found by attending to the preceding part of this description that the "attemperator" has its motion confined to one horizontal plane, that the "hystricon," instead of moving in a horizontal path, has a spiral motion depending on the pitch of the screw 3, situated under the bottom of the mash tun and shewn at 3 on Sheet 4. The hystricon commenced its spiral path on the top surface of the goods, descending at each revolution round the centre of the tub a distance equal to the space between two contingnous threads of the screw, and ending its spiral course when it arrives at or nearly to the bottom of the mash tun, which latter position is indicated by Sheet 6, the grains having been removed from the mash tun as it travelled downwards; but the same effect might have been produced by causing the perforated bottom of the mash tun to rise vertically upwards, the hystricon or similar apparatus revolving in one uniform plane for the purpose of removing the grain, sparging, and agitating, but the one is such an evident modification of the other that I shall not further describe it.

Sheet 2 shews what I call the hop convertor, and it is so marked on the Drawing; it consists of two perforated plates, the lower one situated at a distance of about twelve inches from the bottom of the under bark, and the upper situated at about 24 inches from the aforesaid bottom; between these two plates the hops are placed, and before the wort is let down into the under back, the hops in the hop converter are saturated with water, and the water and hops are heated by means of a steam pipe Z, Z, so as to place the hops in a favourable condition for having their virtue extracted by the hot wort as it passes through the hop converter into the fermenting tun. The tap leading from the under back to the fermenting tun is marked X on Sheet 2. By the use of my improved mashing machine I avoid many of the defects in the common modes of brewing, and my hop convertor superseding the necessity for boiling worts, the great waste and injury incurred by the ordinary practice is prevented, the whole virtue of the hops being washed out by the hot wort after the hops have been marcerated in the hop converter by means of water and steam from the pipe Z, Sheet 2, as previously described.

hops

Sheet 10, Figure 1 is a plan of a subterraneous fermenting room; Figure 2 is a sectional elevation or side view of the same; Figure 3, a sectional end view of the same, cut through at 4, 5, on Figure 1. The same letters and figures describe and refer to the same parts in each plate; *a, a, a, a,* are the lining walls of the room; *b, b, b, b,* the fermenting slate squares, tuns, or vessels; *c, c, c, c,* stone or iron pillars, on which the fermenting vessels *b* are elevated; *d, d,* an upright strong petition, made of either iron plates or masonary, reaching in heighth to within about one inch of the upper edge of the tuns *b,* and extending from one side of the room to the other; *e, e,* a similar petition to *d, d,* but not standing higher than the bottoms of fermenting vessels or top part of pillar *c*; *f, g, h,* a tinned copper pipe, through which the worts run after leaving the coolers or cooling floors to the fermenting vessels *b, b, b, b*; *i, k, k, k, k,* brass stop taps; *l, l,* racking cocks; *m,* steps leading to stage *n, n*; *o, o,* the crutch handles, by which the stop cocks *k, k, k, k,* are turned either on or off; *p, p,* metallic covers, tinned copper is prefered, with ledges about three inches deep, fitted loosely to each fermenting tin; *q, q, q, q,* space occupied by water (to be described) between, under, and around each fermenting tun; *r, r,* a perforated iron floor, elevated about 12 inches above the solid natural floor *s, s, s.* *s, s, s,* the solid natural floor or shield, supported on projecting stays *u, u,* which stays are fixed in the side walls *a, a, a, a.* The cavern or subterraneous fermenting room, Sheet 10, is to be sufficiently deep as to possess an uniform temperature of from 45° to 52° by Fahrenheit's thermometer, which uniformity will depend on the situation and latitude of the place, and other local circumstances generally, not less than 70 nor more than 90 feet below the surface in Great Britain. It is desirable that fermenting rooms, so situated, should be supplied with water from their own interior walls, roof, and floor. The partition *d, d,* is for the purpose of damming or preserving a pool of such exuding waters, equal in depth to the full heighth of the partition *d, d,* by which contrivance the fermenting vessels *b, b, b, b,* are continually surrounded by water, the superfluous water running over the top edge of *d, d,* and down its outside, passing under the iron floor *r, r,* and away either down a drain if the room is situated in a mountain, or into a cavity, and through a pump if situated on or under a plain, and where no fall or drainage can be obtained. In this latter case a pump or other suitable contrivance will be necessary for the extraction of the carbonic acid gas emitted by the contents of the fermenting tuns. The worts having remained on the cooling floors a given time is allowed to pass through the pipe *f, g, h,* through either of the taps *k, k, k, k,* into the fermenting vessel prepared for its reception; during the passage of the worts through *f, g, h,* they (the worts) impart their superfluous

Ferm vats

heat to the running stream escaping over *d*, *d*, under the floor, and erveloping the refrigerating pipe *f*, *g*, *h*; during the time the pipe *f*, *g*, *h*, acts as a refrigerator, the tap *i* must be opened more or less so as to expedite or retard the flow of wort according to its rate of cooling by passing through the cold water. The end *h* of the conveying and refrigerating pipe *f*, *g*, *h*, is closed. The whole of the worts being pitched are thus set to ferment (either with or without yest) at a temperature corresponding with the waters through which it passed; the tap must be turned off, also the tap *k* belonging to such recently filled square. The contents of the squares *b*, *b*, *b*, *b*, can be either covered or left open during the fermentation; if covered, they will be rendered air-tight because the ledges or covers *p*, *p*, are sufficiently deep to enter the water that surrounds the fermentating vessels *b*, and occupying the space *q*, *q*, *q*, *q*, thus forming an hydraulic valve; this provision may be considered necessary under certain circumstances to prevent too great an absorbtion of the oxgyen of the atmosphere, or an extravagant evaporation of the alcohol and other most volatile properties of the fermenting worts. The carbonic acid gas escapes under the ledge of the covers *p*, and through the waters *q*, *q*, *q*, *q*, after elastic force of the gas exceeds the pressure of the water in which the ledges of *p* are immersed. The gas thus emitted is either pumped out of the cavern or flows away with the running waters that pass under the floor *r*, *r*. The dripping waters from the roof of the cavern fall on a netallic shield *t*, *t*, and are conveyed to the side walls *a*, *a*, *a*, *a*, down which the water trickles and contributes to the pool *q*, *q*, *q*, *q*. The shield *t*, *t*, is supported by brackets *u*, *u*, inserted in the walls *a*, *a*, *a*, *a*. The worts having fermented the necessary time, and become quite bright and fit for sale and consumption (for the process of fermenting, cleansing, and fining is commenced and finished in the subterraneous fermenting vessels) is to be removed as follows: The casks (pipes or hose) to be filled are to be placed under the racking taps *l*, *l*, and the tap *k* belonging to the square to be emptied, and turned on by the crutch *o*, which crutch stands out of the water, and above the stage *u*, *u*. The steps and stage *n*, *n*, *n*, are for the purpose of racking and communicating with the crutch handles *o*, *o*, and also the interior of the fermenting squares *b*, *b*, *b*, *b*. In order not to disturb the bottom, or grounds or lees of the articles to be racked, the end of the tap *k* that is inserted in the fermenting vessell *b* is furnished with a racking tube, which floats in the liquor. This racking tube is shewn on Sheet 10, Figure 3, at 6, 7, 8, 10, and it moves round the center of the tube 10, as an axis of motion; at the time of racking, a stratum of beer directly under the surface is continually running into the racking tube at the whole 8, and down the tube 7, into the tap K. The racking taps *l*, *l* being turned on, the finest of the beer is by this means racked off without forming a current in the body of the beer.

The subterraneous fermenting room is lighted by a peculiarly constructed lamp, shewn in plan and sectional elevation on Sheet 11, Figure 1 and 2; the object attained in the construction of this lamp is to light the subterraneous fermenting room without heating it, and for this purpose water is made to pass through the concentrix glass cylinders to absorb the heat while some portion of the light is transmitted through the water contained in the glass concentric cylinders; the entrance of the water is shewn at *a*, and its course is indicated by arrows until the heated water finally escapes at *c*; the tube *b* which supplies the lamp with air passes down to within a few inches of the floor of the subterraneous cavern, and is intended also as a safety lamp, by indicating when the carbonic acid gas in the cavern has risen so high as to stop the end of the tube 13, and put out the lamp, but long before the lamp went out the state of the atmosphere would be indicated by the flickering light of the lamps.

My improvement in mills for crushing malt are shewn on Sheet 9, Fig. 1. A represents the common plan of mounting rolls; B, the improved plan; C, half of a spring, with its flexible end working on a sliding rod D, which rod keeps the carriage E close up to the end of the regulating screw F. The object and merit of B over A are as follows:—The rolls can be kept at a certain distance assunder by the screw F, by which separation the crushing of every hard or gritty substance, such as stones, however small, and such as usually accompany the barley or malt, is avoided, as is also the consequent indentation of the face of the rolls. In case a pebble or nail, or any other substance that is either harder or larger than the grain, should find its way between the rolls, the spring C will give way, and the small roll will recede from the larger one, so as to allow the substance to pass through without injury to the rolls, or risk of breaking an axle or other part of the machine. Fig. 3 is an end view of Fig. 1. Fig. 2 shews my improved method, and Fig. 5, the common method. Fig. 4 shews my improved method where a weight and toggle levers supersede the spring C, Fig. 1.

Having now described my Inventions, I proceed to what I claim as my exclusive privilege. I claim the improved mashing apparatus, and attemperator, shewn on Sheets 1 to 8, where the attemperator is made hollow for the purpose of diffusing heat uniformly through the mash by moving therein; and I claim constructing mashing machines with hollow spaces for the conveyance of hot fluids.

I claim as of my Invention the hystricon described in this my Specification as a means of removing the grains from the surface of the goods, and sparging the mash, together with the apparatus which I call the porcupine, for agitating the surface of the mash, and the endless web for removing the grains from the mash tub.

I claim the improvement in "apparatus for brewing" which are pointed out on Sheet 9, for preventing breakages to mills for crushing malt.

I claim the hop converter, shewn on Sheet 2, whereby the necessity for boiling wort is obviated.

I claim constructing fermenting vats of slate, and lining vats with earthenware or porcelain tiles as a preventative to foxing acidity.

I claim the floating racking tube, shewn at Fig. 3; 6, 8, 7, 10, on Sheet 10.

I claim the trepidator, shewn on Sheet 11, Fig. 3, as a means of rousing the contents of the gyle tun.

I claim the employment of subterraneous fermenting rooms, Sheet 10, in the earth for the purpose of attaining an uniform temperature, as before described for the purpose of preventing acidity.

I claim the hydraulic covers to the fermenting tuns on Sheet 10.

I claim the employment of lamps, constructed as shewn on Sheet 11, for giving light to subterraneous fermenting and stove rooms, and abstracting the heat, and for the mode of making such lamps act as safety or warning lamps, as previously described.

In witness whereof, I, the said William Littell Tizard, have hereunto set my hand and seal, this Fifth day of October, in the year of our Lord One thousand eight hundred and forty-one.

W. L. TIZARD. (L.S.)

AND BE IT REMEMBERED, that on the Fifth day of October in the year of our Lord 1841, the aforesaid William Littell Tizard came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

Baker, Extra.

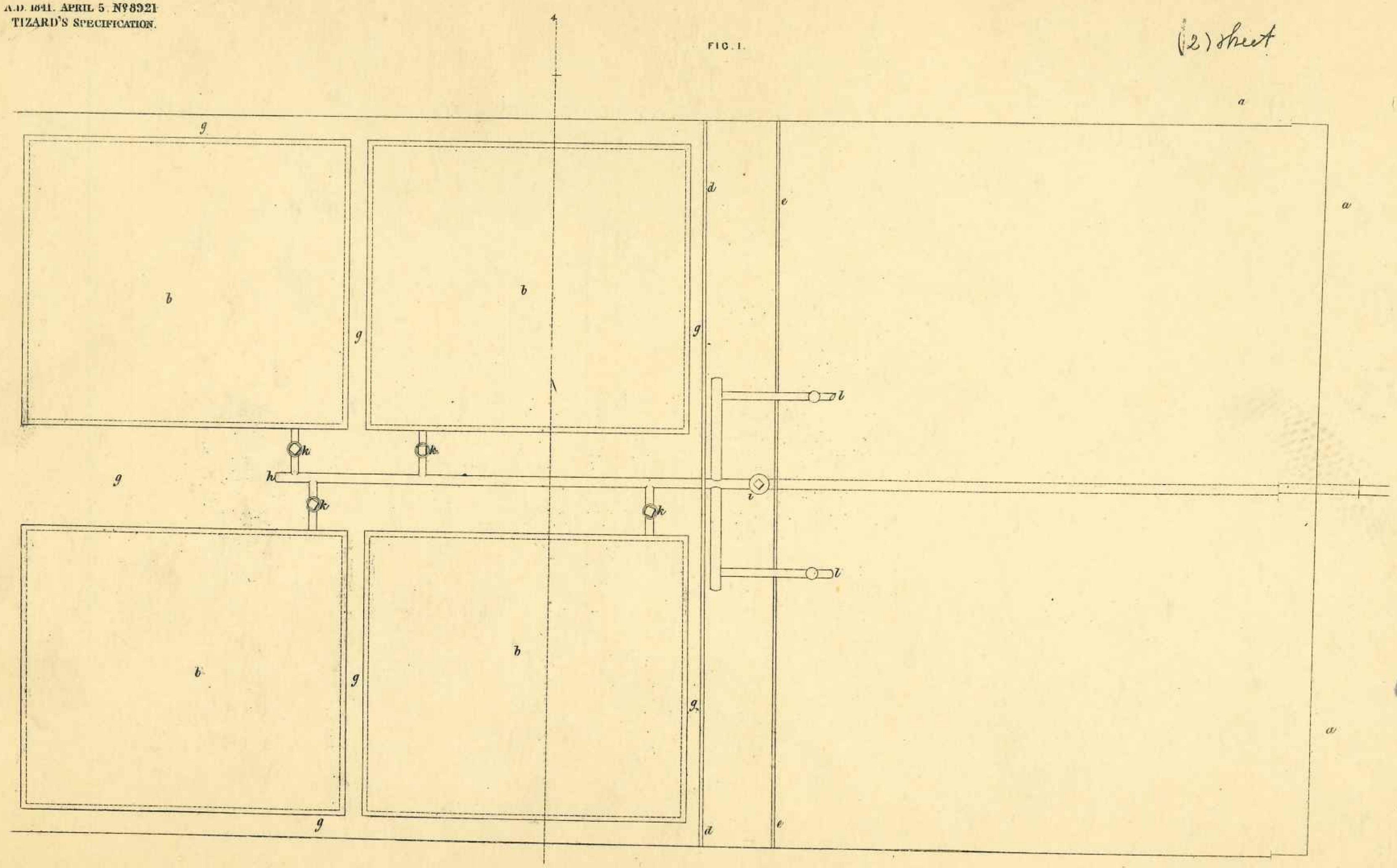
Inrolled the Fifth day of October, in the year of our Lord One thousand eight hundred and forty-one.

LONDON:
Printed by George Edward Eyre and William Spottiswoode,
Printers to the Queen's most Excellent Majesty. 1856.

A.D. 1841. APRIL 5. Nº 8921
TIZARD'S SPECIFICATION.

(2) sheet

FIG. I.



185. ALCOHOL.
Ferment.
Apparatus.
Vats.
British Patent

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105. ALCOHOL,
Fermenting-
Apparatus-
Vats.

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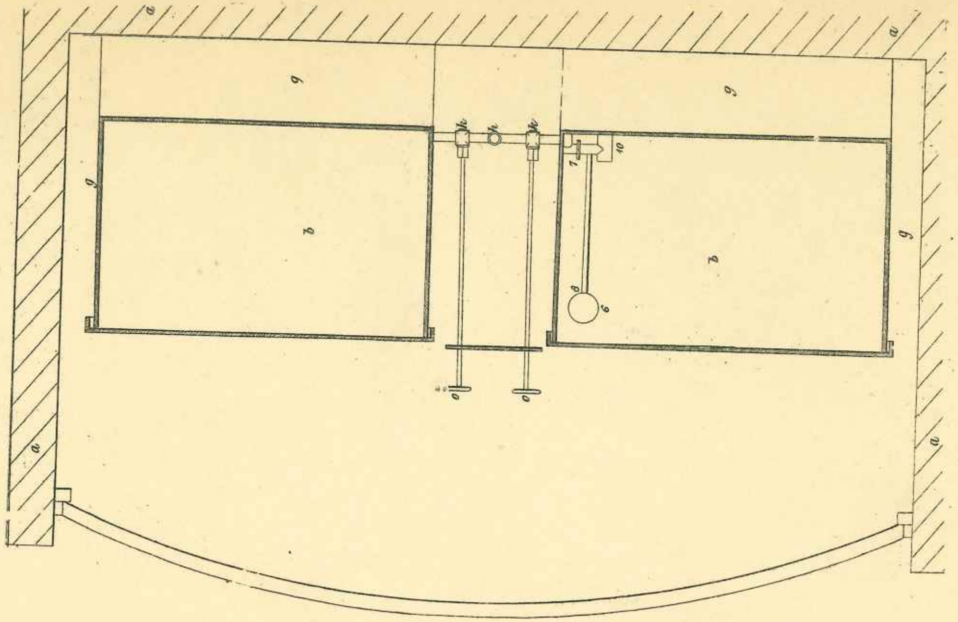

FIG. 3.

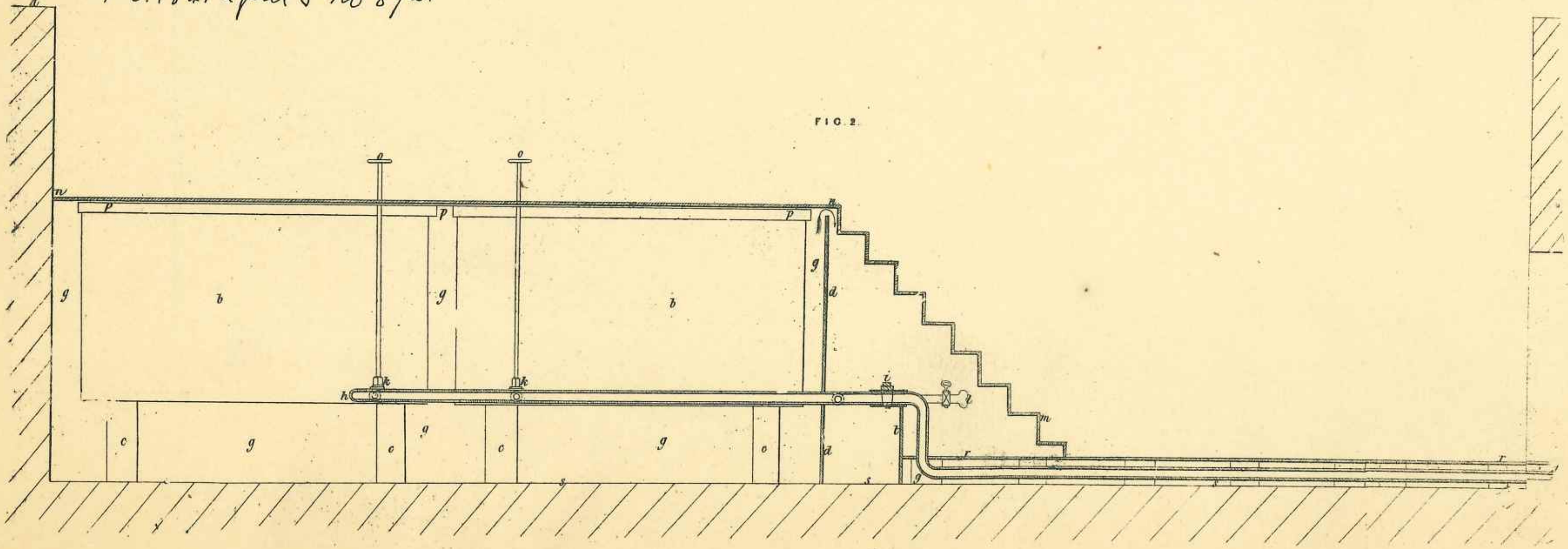

FIG. 2.

A.D.1841. APRIL 5. No 8921.
TIZARD'S SPECIFICATION.

(11 SHEETS)
SHEET 5.

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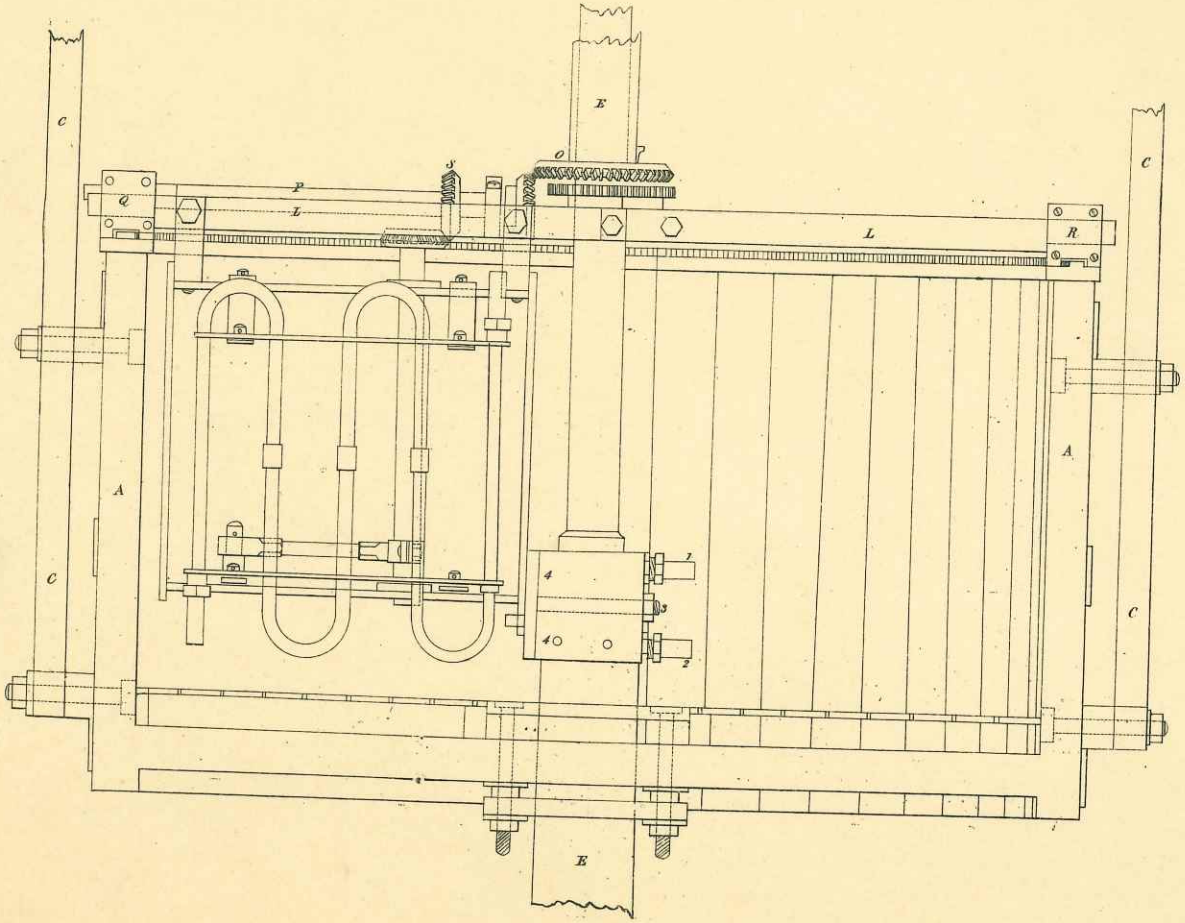

195. ALCOHOL;
Mashing-
Apparatus-
Mash-tubs-
Rakes.

British Patent

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